American Bureau of Shipping

CERTIFICATE NO.
LA11015-X

PORT OF ISSUE
LOS ANGELES

BUILDER'S HULL NO.
0150

DATE

Interim Class Certificate

THIS IS TO CERTIFY THAT I HAVE SURVEYED THE FIBERGLASS REINFORCED PLASTIC SINGLE SCREW DIESEL MOTOR YACHT "[redacted]" AT SAN FRANCISCO, CALIFORNIA, AND FOUND THE SAME TO BE IN GOOD CONDITION AT THE TIME OF THE DELIVERY, DISPATCH FROM [redacted], CALIFORNIA AND:

THAT I HAVE [redacted] OF THE AMERICAN BUREAU OF SHIPPING. [redacted] UNDER THIS VESSEL'S CLASS FOR OCEAN SERVICE IN ACCORDANCE WITH THE LIMITATION IN THE DESIGN APPROVAL "IN NO CASE IS [redacted] TO BE DISTRIBUTED IN SUCH A MANNER AS TO EXCEED THE LIMITS GIVEN IN HOMETROP INCLINING CORPORATION REPORT DATED [redacted], "STABILITY BOOK".

AND;

THAT I HAVE RECOMMENDED THAT THE VESSEL BE CLASSED

✦A1 [redacted], MACH [redacted] SERVICE, ANNUAL SURVEY, [redacted] TO PERMIT POWER LIMITED TO A MAXIMUM LOAD OF 500 HORSE [redacted] CORRESPONDING TO THE [redacted] DESIGN DISPLACEMENT.

Charles A. [redacted]
Charles A. [redacted] SURVEYOR

[redacted]

Figure 1 - Typical ABS Certificate

DESCRIPTION OF THE FIBREGLASS REINFORCED PLASTIC LASH BARGES (FRPLB)

Length over-all	61' 06"
Beam	31' 02"
Height	14' 05"
Cubic Capacity - Bale	19,700 cu. ft.
- Grain	20,000 cu. ft.

Tare weight. Due to the method of construction the weight of each FRP LASH barge will vary. The assumed weight for this group of barges is approximately 55 L/T based on the exact weight provided for similar barges placed in the LASH service. Any subsequent repairs made or water trapped within the honey-comb structure of the hull when repairs are made may alter the tare weight. In all cases the draft marks should be used to verify the tare weight and in establishing the weight of cargo carried. Refer to Addendum 2 for a deadweight/displacement scale.

Addendum 3 contains a drawing of this type LB showing pertinent internal measurements.

As constructed, the LB are equipped with two folding hatch covers, each consisting of two hinged sections that are raised by a hydraulic pump located at the right hand corner at each end. These pumps can, in an emergency, be activated by hand, however, this involves considerable time and physical effort. The hatch covers are normally opened by attaching a powered tool such as an electric or air operated drill or gasoline powered chain saw or lawn mower motor with a drive unit attached. This will operate the pump at a speed sufficient to completely open each cover in approximately five to ten minutes.

Lowering of the covers is performed entirely by gravity. There is a chain restrainer attached to prevent covers from closing accidentally.

There is a 4" sounding tube at each bilge to sound for water in the bilges. A portable pump may also be used in this tube to remove excess water from the interior through the bilges.

There is an existing ladder located on the left side of each end of the barge opening for access into the LB. For bulk operation it is recommended that these ladders be removed and portable ladders be used. This will facilitate the use of clam shells and other equipment used in loading and discharging the bulk commodities and prevent damage to the ladders.

At each end of the barge on the center line there is a gooseneck vent with a flap hinge. This can be left open under normal storage conditions but should be closed when under tow to prevent water from entering the interior. Certain commodities may require specific venting procedures, therefore, this should govern the use of the vents.

The four bits located at each corner are well secured into the hull structure and can be safely used for all mooring and towage purposes.

The two existing Beebe winches are not heavy enough for towing purposses. It is recommended that they be removed and replaced with 10 ton Olympic wi[illegible], or equivalent.

Maintainence of the fiberglass hull surface is simplified since ccorrosion problems are limited to the steel fittings and hardware only. Generally, only these steel fittings require periodic refinishing to maintain the surface of the barge. Maintainence is also simplified because marine growth formation of the fiberglass hull is comparatively slow and is normally removed by high-pressure water hoses.

The continuous support provided to the skins by the fiberglass honeycomb core allows loads up to 7 tons per square foot to be carried on the load deck without damage, however, excessive overloading or severe impace from very heavy equipment can cause local crush of the fiberglass honeycomb. The operator must therefore protect the hull from severe impacts by using suitable fenders and limiting heavy impacts with tugs, pieres, and equipment. Northrop has conducted preliminary design studies of two protective devices which will greatly reduce impact damage to the tank top and the barge exterior walls. If the contemplated barge service is such that damage to these surfaces may occur, consideration should be given to this impact protection. The tank top damage due to dropped cargo or impact from bulk cargo unloading equipment. The corner fenders shown in Figure 7 could be permanently attached to the barge corners and could be expected to provide substantial protection from damage to the external walls and corners due to impact with piers or other barges.

When local damage to the fiberglass structure does occur, repairs can normally be rapidly accomplished afloat without the use of heavy or specialized equipment.

With proper use and minimum maintainence, the FRP barge will provide many years of service without the threat of continuous degradation of materials by rust.

A high-performance polyester laminating resin is used for fabrication of the skin laminates. This resin has been formulated to Northrop specifications to provide high strength retention after long-term water immersion. The resin used to impregnate the surface plys of the outer skins of the structure contains a grey pigment compound which protects the laminate from ultra-violet deterioration and provides a permanent finish.

Honeycomb Core

The honeycomb core is fabricated by bonding together several layers of cured fiberglass corrugated sheets as shown in Figure 4. The individual corrugated sheets are a fiberglass-reinforced polyester resin and are approximately .025 inches (.6mm) thick. The sheets are bonded to one another with a ployester resin adhesive applied in continuous beads along the nodes of the corrugated sheet material. This resin is formulated to provide high adhesion to cured fiberglass laminates, and the high flexibility desired in bond joints. The thickness of the core slabs used (which establishes the final panel thickness) varies between the components.

CONSTRUCTION

The entire barge structure is double-skinned honeycomb construction. The total thickness of the various sections are: bottom, 18 inches.; sidewalls, 6 inches; endwalls 10 inches; upper deck, 6 in.; hatch covers, 8 in. Each of these sections consists of a fiberglass, steel honeycomb core to which inner and outer woven roving fiberglass skins are bonded. The sections are fabricated seperately and then joined to provide a completely bonded fiberglass hull assembly. This bonded assembly eliminated the use of fasteners in the basic hull minimizing the possibility of hull leakage. Grey pigmented resins are used in the barge fabrication to provide ultraviolet resistence and to minimize refinishing requirements.

The general arrangement of the barge is shown in Figure 2, and longitudinal and transverse sections of the FRP hull are shown in Figure 3.

CAPACITY & DIMENSIONS

Outside	Length	61'6"	
	Breadth	31'2"	
	Height	14'5"	
Inside	Length	59'10"	
	Breadth	30'0 "	
	Height	11'10"	
Lightship	Displ.	60ST.	
	Draft	1' 7"	
Deadweight (LASH)	Displ.	500ST	375ST
	Draft (S.W.)	8'8"	6'8"
	Draft (F.W.)	8'11"	6'10"
Deadweight (River Barge)			
	Displ.	685*	
	Draft	12'	
Cubic capacity		20,000 Cu. Ft.	

*Depending on service conditions.

Bottom	18 inches	(.46m)
Sidewalls	6 inches	(.15m)
Endwalls	9.5 inches	(.24m)
Upper Decks	5 inches	(.13m)
~~Hatch covers~~	~~8 inches~~	~~(.20m)~~

no good

Sandwich Panel

The laminated skins and honeycomb core sections are bonded in an assembly which forms a sandwich panel as shown in Figure 5. The bonding is accomplished with a lightweight polyester resin compound referred to as syntactic foam. The gaps between the adjacent core sections are filled with a urethane foam-in-place material which results in continuity between core sections. This construction allows very large panel sections to be moved in one piece and is used for fabrication of the eleven sandwich panels which make up the barge structure:

1. Bottom
2. Sidewalls
3. Endwalls
4. Upper Decks
5. ~~Hatch Covers~~

no good

Hull Assembly

The individual panels of the barge are bonded together to form the hull assembly using fiberglass laminates, syntactic foam, and internal steel reinforcement. All joints are covered, inside and outside, with several plys of fiberglass cloth maintaining the double-skin feature throughout the structure.

Steel Fittings

Steel fittings are hardware attached to the barges by bolting or by encapsulation. The encapsulation approach, which is merely potting of a fitting in place with syntactic foam, is used for the hatch cover hinge fittings, cargo tie-downs (pad eyes) and the corner posts. Other steel fittings are attached by bolting, utilizing either thru bolts or lag bolts. The heavy fittings as the kevels are attached with thru bolts and are mounted on areas of the deck which are poured full depth with syntactic foam to provide the highest possible strength.

MAINTENANCE AND REPAIR

INTRODUCTION

The fiberglass reinforced plastic LASH barges are constructed of hexagonal honey-comb laminated together with several layers of fibreglass impregnated with resin. Where the sides join the bottom, steel reinforcing bars are bent at right angles at the turn of the bilge. A Semi-elastromeric syntactic pour was used to bond the structure together. This is semi-rigid material. All fittings are well secured into the hull with a solid pour and no known failure of this bond has occurred.

Because of the type of construction the life expectancy of these barges could be almost unlimited, since there is no deterioration of the plastic structure materials from either time or weather. All of the exposed metal components will require normal maintenance in order to keep them in good operational condition. They are virtually unsinkable due to their light weight construction. The barge itself can not sink, even when filled with water. With the honeycomb construction any breakage in the outer fibreglass sheathing will only permit local water penetration in that area. Entry of water into the cargo compartment could only be made if the inner fibreglass sheathing were also punctured in the same area.

MAINTENANCE

Paint can be applied to the outer hull for aesthetic reasons but is not required for maintenance of the fibreglass structure itself. All exposed metal fittings should be preserved in a suitable manner from deterioration.

LUBRICATION

The normal lubrication period is approximately six months. A minimum number of lubricants are required. Since none of the moving parts operate at high speed, the waterproofness of the lubricant is as important as other characteristics. All bearing points are "Zenk" type fittings. Only conventional hand-held grease guns and oil cans are required.

The hinge butt pins (4), Hinge interleaf pins (4), hatch cover wheels (4) and the mooring winches (2) should be lubricated with ESSO Marine Beacon 3 Marine Multi-Purpose Grease; long fibre lithium base waterproof suitable for service - 30°C (-22°F) to + 125°C (257°F) or reasonable equivalent. If the existing Beebe winches are replaced with four Olympic winches there will be additional grease points to lubricate.

The hatch dogs are of stainless steel and will require a light oil lubricant at regular intervals so they will work freely.

Minor delamination or puncture of the fibreglass skin, inner or outer, can be repaired by pouring on any of a number of plastic resin adhesive/filler materials on the market.

Where fiberglass sheathing must be replaced, use a like amount for the area involved. Woven roving is the cheapest and adequate. Since it is necessary to saturate the cloth with resin, it is easier to do so with woven roving than the more expensive boat cloth. Normal procedures for installation of fibreglass should be followed.

Where major damage to the hull is involved and it is necessary to replace any of the hexagonal honey-comb, be sure to buy non-teflon coated. Teflon is often sprayed on the hexagonal material to keep it from sticking together in storage. This results in severe problems of adherence in repairing.

Where it is necessary to cut out a damaged section for replacement, a good "Skil" saw with a cheap steel blade can be used. Carbide blades will last longer but their greater cost will not pay for this difference. The fibreglass will destroy almost any cutting material in a short time. Any drilling, on the other hand, should be done with carbide bits since the fibreglass will chew up even the sides of a steel drill. Replace the damaged hexcel removed with a like amount. Cover the damaged area with the woven roving saturated with resin in accordance with standard fibreglass repair procedures.

Where the bottom hull is damaged and water has entered into the honeycomb, it will be necessary to drill holes in the bottom to drain the honey-comb and then effect repairs as above. Bottom repairs require drydocking of the barge and can be difficult to accomplish.

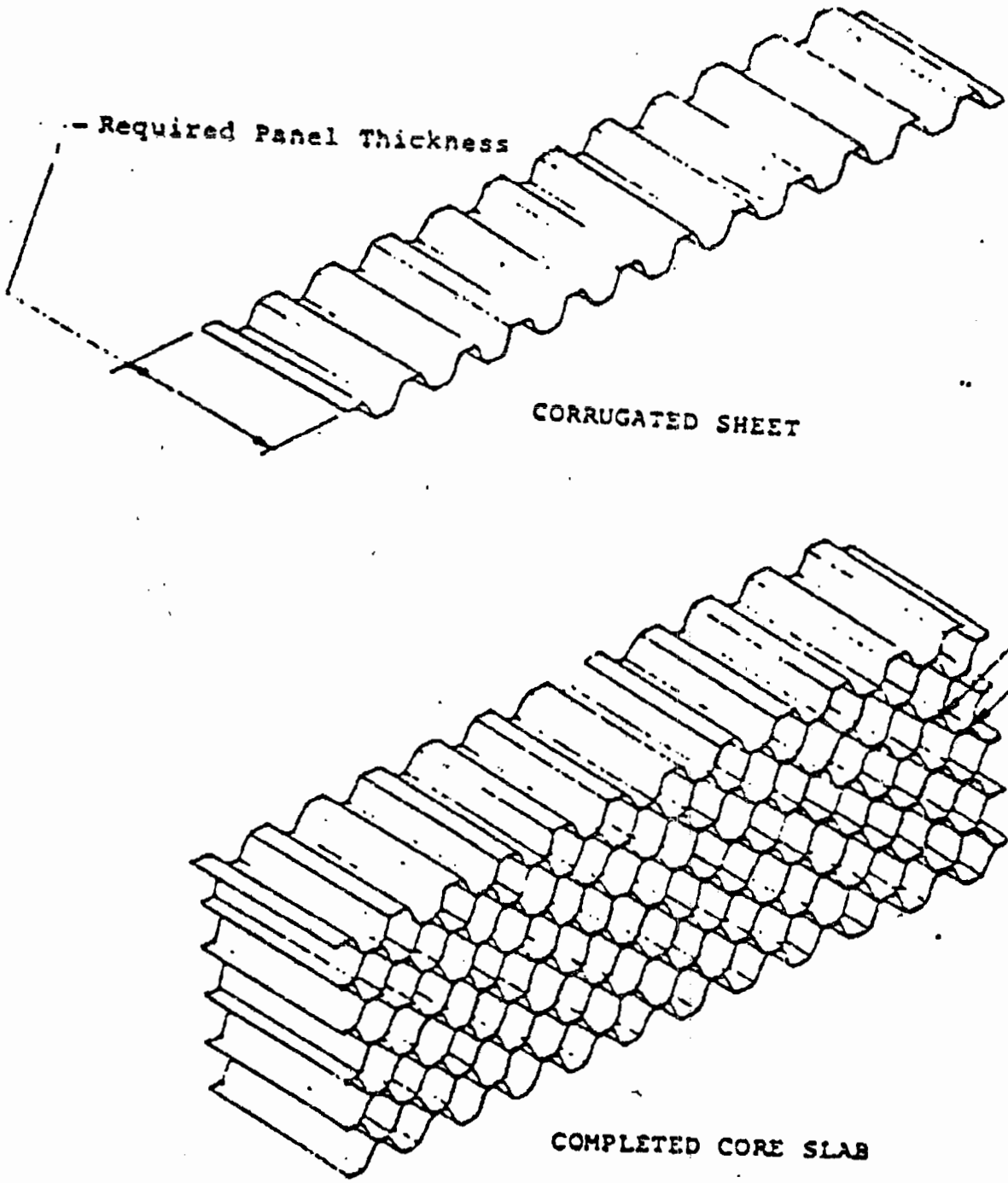


FIGURE 4 - HONEYCOMB FABRICATION

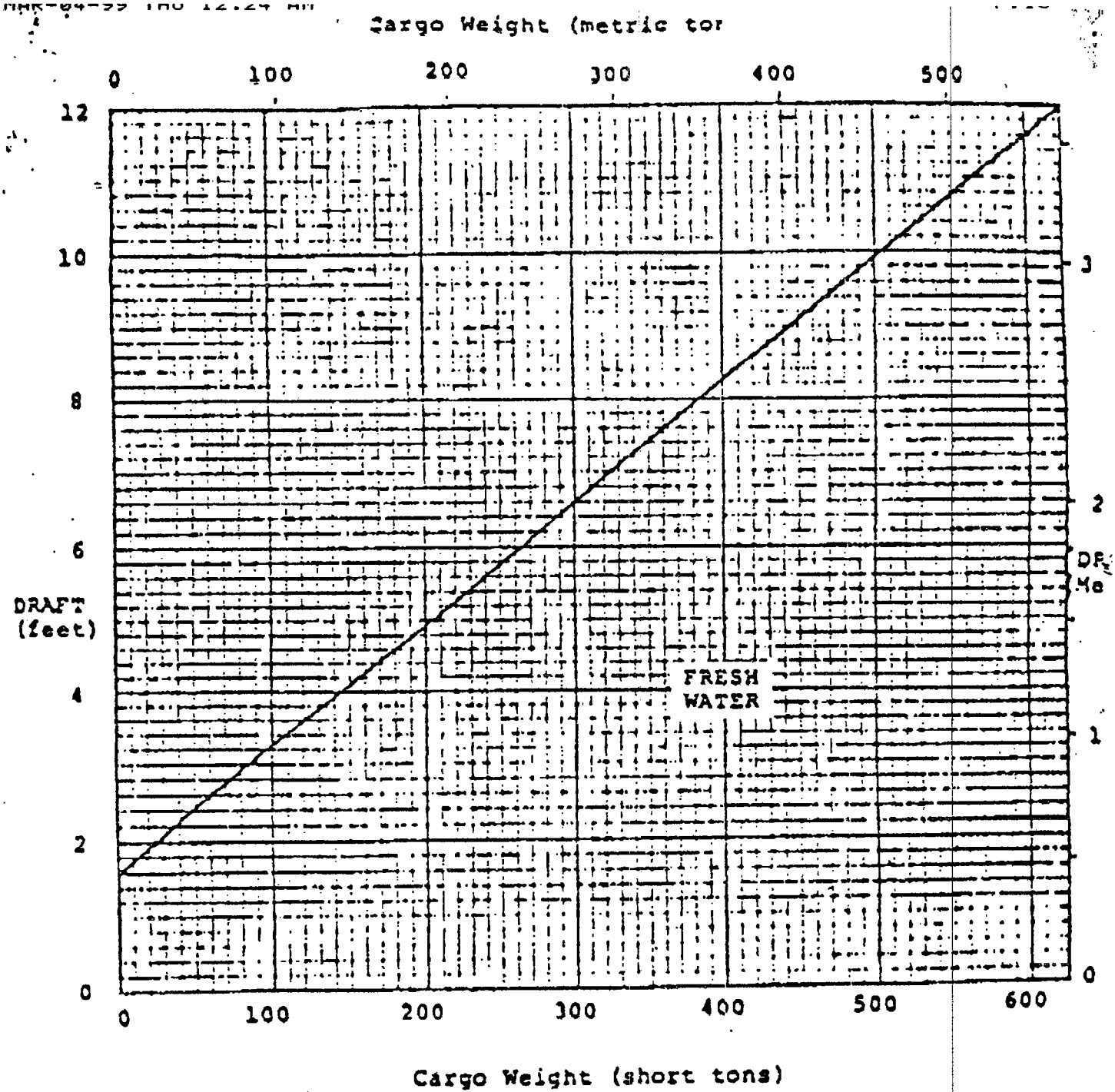
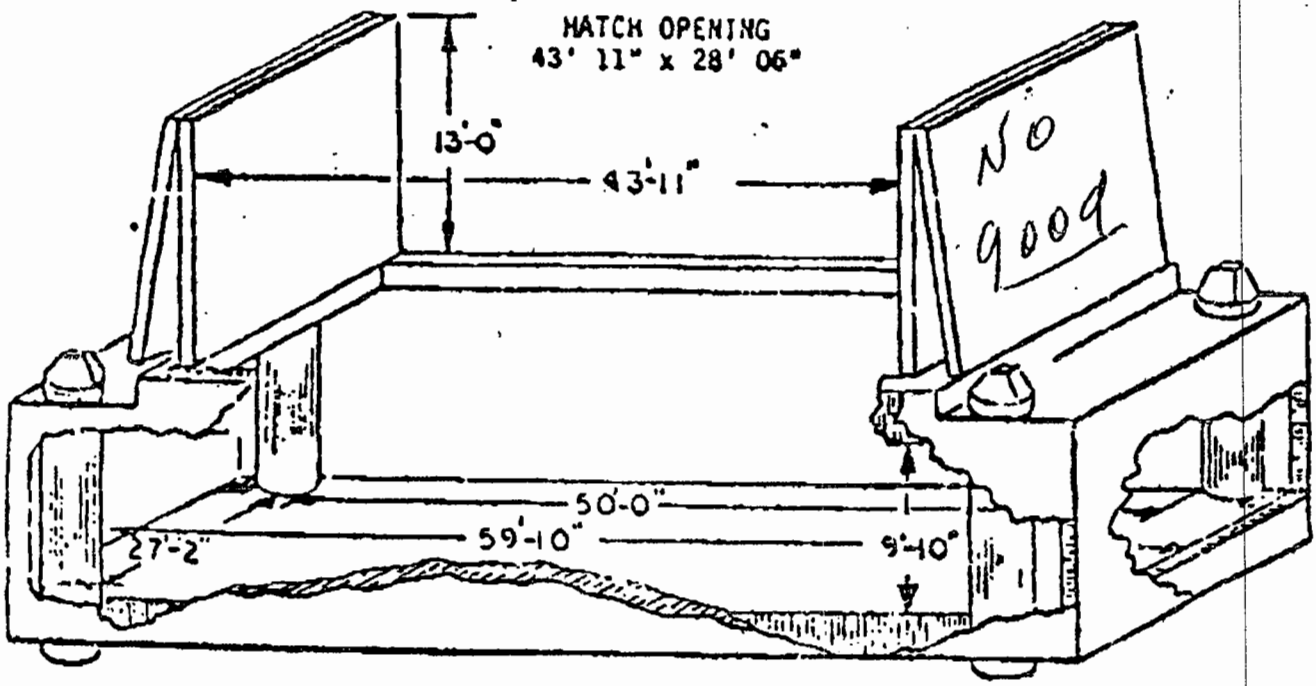


FIGURE 3 - CARGO WEIGHT vs DRAFT

Addendum 3

DIAGRAM OF FRPLB WITH PERTINENT DIMENSIONS



INSIDE CLEARANCES

9' 10" under coamings
11' 08" under hatch covers
11' 03" under hatch cover hinges

Ladders protrude 9½" into interior.
Posts protrude 14" into barge interior
Hinges protrude 4½" down into interior.

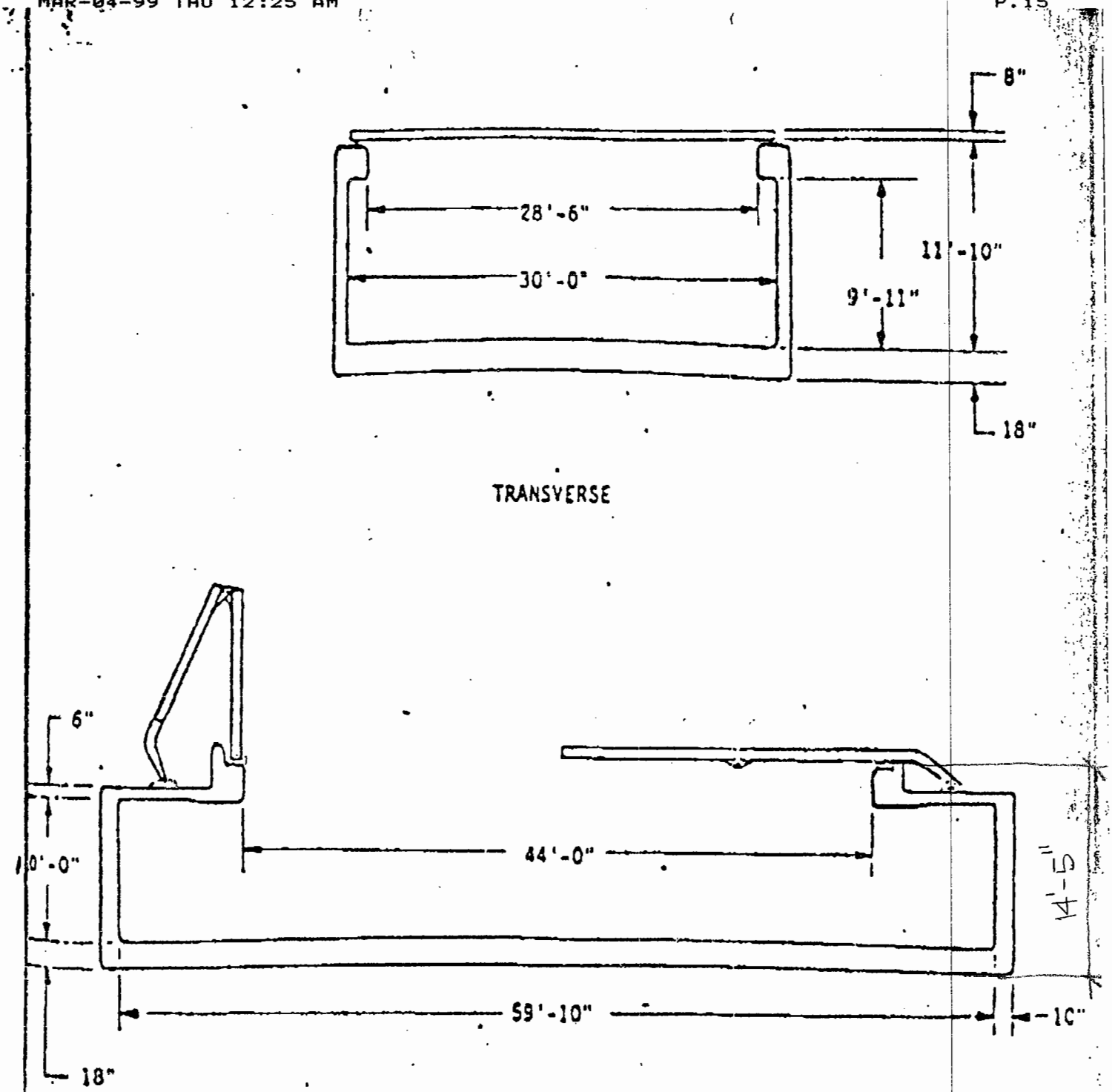


Figure 3 - Hull Sections

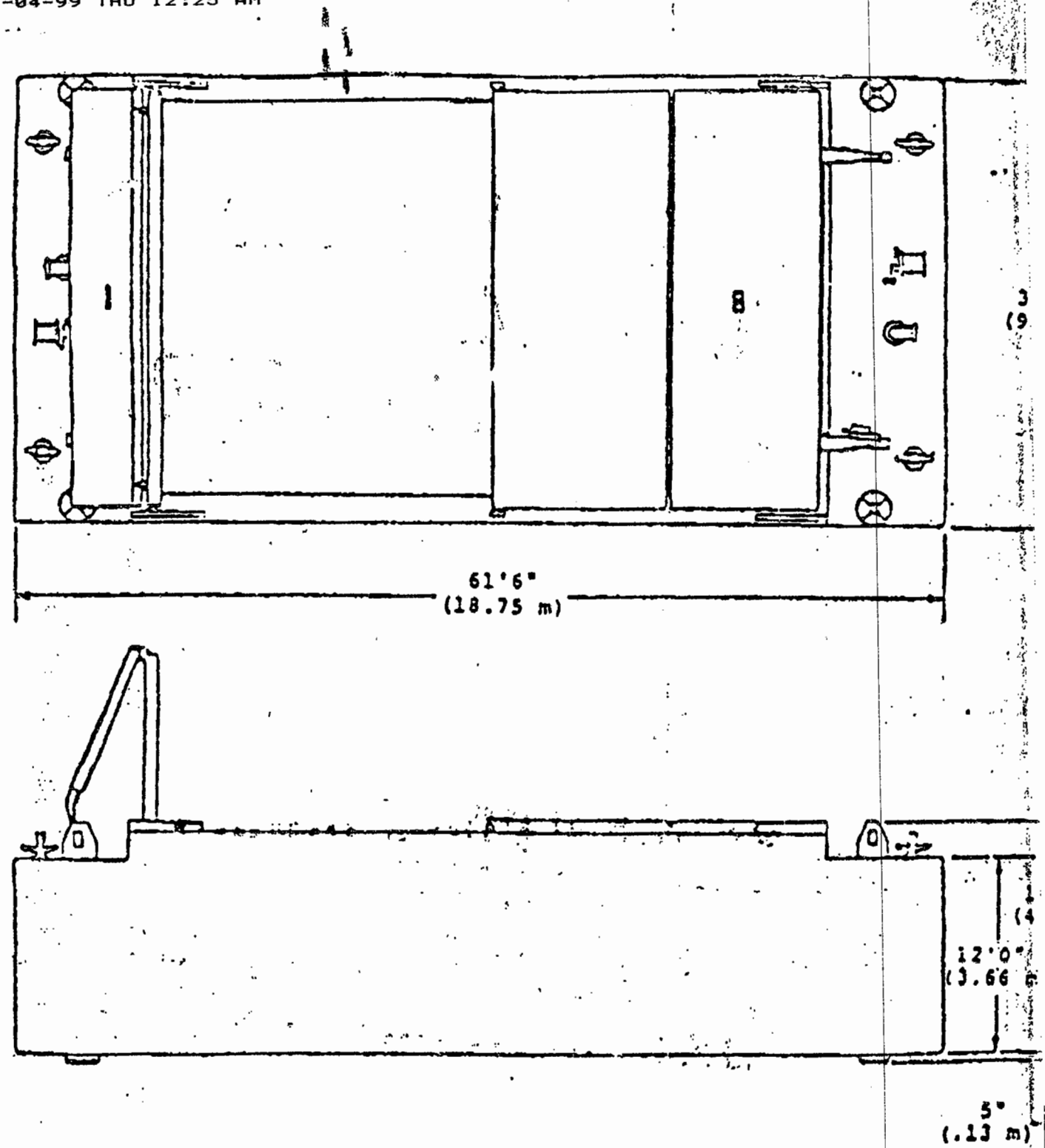


FIGURE 1 - GENERAL ARRANGEMENT